MINUTES

CALIFORNIA TRAFFIC CONTROL DEVICES COMMITTEE
MEETING OF September 5, 1996

The third meeting of the CTCDC in 1996 was held in the Caltrans Headquarters Auditorium, at 1120 N Street, in the city of Sacramento, on Thursday, September 5, 1996.

Chairman Wayne Tanda opened the meeting at 9:03 a.m. with the introduction of members and guests. The Chairman thanked Caltrans on behalf of the Committee.

The following members, alternates, and guests were in attendance:

ATTENDEES	ORGANIZATION	TELEPHONE
Members (Voting)		
Wayne Tanda Chairman	League of California Cities, City of San Jose	(408) 267-4945
Merry Banks Vice Chairman	California State Automobile Association, San Francisco	(415) 565-2297
Bruce Carter	County Supervisors Association of California, Shasta County	(916) 225-5661
Capt. Joe Farrow	California Highway Patrol, Sacramento	(916) 657-7222
Dick Folkers	League of California Cities, City of Palm Desert	(619) 346-0611
Jack Kletzman	California Department of Transportation, Sacramento	(916) 654-4715
Ray Mellen	Auto Club of Southern California	(213) 741-4373
John Wallo	County Supervisors Association of California, San Luis Obispo County	(805) 781-4466
Jack Kletzman Secretary	California Department of Transportation, Sacramento	(916) 654-4715

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ATTENDEES	ORGANIZATION	TELEPHONE
John Alleman	Caltrans, Sacramento	(916) 654-7266
Rick Blunden	Caltrans, Sacramento	(916) 653-0036
Butch Breault	City of Davis	(916) 757-5686
Vic Barbarick	Caltrans, District 4	(415) 330-6500
Roy Dexter	IDC	(510) 828-4579
David Evans	Hewlett-Packard	(408) 435-6144
Jack Fleck	City/County of San Francisco	(415) 554-2344
Jonathan Flecker	City of Davis	(916) 757-5686
Betty Fowler	Caltrans, District 3	(916) 741-4452
David Gamboa	Caltrans, District 3	(916) 741-4370
Hal Garfield	Consultant	(916) 487-2869
Joe Genovese	City of Oxnard	(805) 385-7866
Paul Gunkel	Sacramento County	(916) 440-5966
Marty Hanneman	City of Sacramento	(916) 264-5307
Michael Harrison	Light Guard System	(707) 542-4547
Bill Hoversten	Caltrans, Sacramento	(916) 654-4555
John Keber	Caltrans, District 3	(916) 741-4453
Dwight Ku	California State Automobile Association, Sacramento	(916) 443-2577
Gerry Kundert	Caltrans, Sacramento	(916) 654-5251
Mark Leja	Caltrans, District 3	(916) 324-1665
Perry Lowden	Consultant	(916) 673-2214
Marie McDonald	Relume	(510) 939-9787

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ATTENDEES	ORGANIZATION	TELEPHONE
Hank Mohle	Hank Mohle & Assoc.	(714) 738-3471
Ann Murphy	Caltrans, District 3	(916) 741-4454
Carol Pearce	Caltrans, District 3	(916) 327-3854
Dave Pelz	City of Davis	(916) 757-5686
Joan Pontius	Caltrans, District 3	(916) 741-4362
Steve Prey	Caltrans, Sacramento	(916) 653-4257
Chris Ramstead	Los Angeles County	(818) 458-5908
Ahmad Rastegarpour	Caltrans, Sacramento	(916) 654-7143
Sal Rosano	City of Santa Rosa	(707) 543-3558
Dave Royer	Consultant	(805) 255-6556
Mohammad Siddiqui	Stanislaus County	(209) 525-6552
Stuart Spoto	Hewlett-Packard	(408) 435-6260
Gerry Tripp	Caltrans, District 6	(209) 488-4174
Ed von Borstel	City of Modesto	(209) 577-5266
Steve Weinberger	W-Trans	(707) 542-9500
Tom Wood	Caltrans, District 3	(916) 741-4352
Robert Zeigler	Marin County	(415) 499-6336

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MOTION: By Bruce Carter, second by Dick Folkers, to adopt the minutes of the San Diego meeting, held on January 25, 1996. Motion carried 8-0.

90-7 BICYCLE SIGNAL HEAD

It is estimated that there are over 50,000 bicycles in the City of Davis, attributed mainly to the university located there, and that they constitute 20% of the traffic trips in the city.

Dave Pelz presented a video showing "before" and "after" movements of traffic through the intersection of Russel Boulevard and Sycamore Lane. This intersection was equipped with special signal indications for bicycles so that motorists and bicyclists would have separate movements. This "T" intersection is a major access route for university students living in the western portion of the city. Five other locations were also approved for experiment by the Committee.

Peak hourly volumes were estimated at 1100 bicycles per hour and 2300 motor vehicles per hour. Establishing separate movements for bicyclists and motorists is an attempt to reduce or eliminate the conflict between them. Motorists may not go on a green signal phase meant for bicyclists and bicyclists may not go on a green meant for motorists.

Accident data appears to confirm a reduction in conflicts. In the three years prior to modification, a total of eighteen bike-auto-pedestrian collisions were reported to the Police Department. Numerous near collisions were reported to the Department of Public Works. Since the signal modification, in late 1994, two collisions have been reported, neither of which were related to the operation of the intersection.

90-7 BICYCLE SIGNAL HEAD (continued.)

Dave Pelz cautioned that this device is only intended for applications where high volumes of bicycles interact with large numbers of vehicles. He stressed that some action is needed with regard to modifying provisions of the Vehicle Code. The City of Davis passed a local ordinance to allow Davis police to enforce these signals.

Dave Pelz said that this signal is part of a coordinated system. He feels there is less delay for motorists, after the installation of the bicycle signal heads, because the conflict has been eliminated. The intersection had been changed from fixed time to traffic actuated signals. When bicycle volume is low, such as in the summer or in the evening, the phase reserved for bicycles is discontinued.

Dave Pelz told the Committee that the City of Davis Police Department in conjunction with the University of California at Davis campus police, were very active in enforcing traffic regulations with respect to bicycles. Pelz said that the police found people adjusted very quickly to the new system and as a result little enforcement was needed at this intersection. Although the consensus of the Committee was that the experimental device appears to work well at this intersection, Ray Mellen, Bruce Carter, and other members of the Committee suggested other areas do not have such a extensive bicycle population, and warrants were needed to be developed.

Dave Pelz explained that five of the other approved intersections were locations where signal heads were visible to bicyclists and not motorists. The purpose was to train bicyclists to look at the bicycle signal head instead of the pedestrian signal head. The bicycle phase is separated from the pedestrian phase and a shorter phase can be used to interrupt vehicular traffic. There have been no accidents attributable to these five signal heads.

The seventh location would have been confusing for the bicyclists to obey one set of signals at the intersection and a different set of signals at a left turn pocket. The City concluded that this seventh location was not a good application for the proposed bicycle signal heads. Pelz pointed out that there are other intersections in Davis, which were not included in the experiment, where bicycle signal heads would be beneficial.

90-7 BICYCLE SIGNAL HEAD (continued.)

Dave Pelz said the City would pursue changes needed in the vehicle code. Chairman Tanda pointed out that the proposed bicycle signal heads treat bicycles differently from motor vehicles which is in conflict with the Vehicle Code.

Rick Blunden told the Committee that this issue had been discussed at the California Bicycle Advisory Committee (CBAC) meeting and that CBAC would work jointly with the City of Davis to revise the Vehicle Code. Blunden also said CBAC had concerns about giving local agencies the authority to regulate bicycle travel on a public roadway. He confirmed that CBAC was supportive of the experiment and that there are some applications for the device. Dick Folkers responded that most local agencies would not employ this device unless there were abnormally high bicycle activity.

Rick Blunden said that it was Section 21206 of the Vehicle Code that allows local agencies to regulate bicycle operations on bicycle or pedestrian facilities and which needs to be modified. Blunden said that CBAC did not have a concern about modifying the Vehicle Code to allow for the implementation of bicycle signal heads, but there is a question of whether this would open the door for some other restriction.

A motion was made to recommend approval for the bicycle signal heads subject to appropriate warrants, standards, and changes in legislation. Jack Kletzman felt the device appeared to work well for that particular intersection, but the motion was premature in that warrants, standards, and proposed legislation should be part of the approval process.

Joe Farrow felt it was inappropriate to have the warrants and the legislation moving at the same time. He suggested the warrants should be approved by the Committee prior to the submittal of draft legislation. Bruce Carter pointed out that it will take some time for CBAC and the City to develop warrants, standards, and legislation. Since there aren't going to be many other communities using this device, he suggested that the City continue observation under the experimentation approval until the additional items sought by the Committee are available for review.

90-7 BICYCLE SIGNAL HEAD (continued.)

Harold Garfield told the Committee that traffic signals in Europe were on the near right as opposed to across the intersection as they are in Davis. He visited the experimental intersection in July and saw six violations of the NO RIGHT TURN ON RED in a one half hour period of time. He said the NO RIGHT TURN ON RED sign was lit, but motorist were looking at the green indication for the bicyclist. He suggested a program visibility head so that motorists do not see the bicycle signal. He also recommended additional signs to indicate which signals are for bicycles only.

Ahmad Rastegarpour expressed concern that because Davis is so unique in its transportation mode, establishing a standard based on these findings would cause a problem for other local agencies. He established that the intersection had a 90 second cycle length. The cycle length remained the same, but the quality of service increased.

Rick Blunden said that CBAC was not supporting that Caltrans adopt a standard based on the Davis experiment but recommended that the Committee provide the City with some means by which they could develop the warrants and proposed legislation.

Ray Mellen suggested that a premature motion to approve would delay the work of the Committee. If the Vehicle Code identifies a particular city for preferential treatment, there will be pressure to expand that provision, and the Committee would need to provide warrants in any event. Mellen suggested it might be preferable to develop the warrants initially while allowing the City to continue using the device. He expressed confidence that properly drafted warrants would limit use to appropriate circumstances. Jack Kletzman concurred, noting that as long as the City has been granted authority to experiment they could continue to use bicycle signal heads while they are developing the warrants and draft legislation. The Committee would then be in a better position to make its recommendation.

Several versions of motions were discussed including the formation of a CTCDC subcommittee. Rick Blunden noted that CBAC is set up with a similar representation to CTCDC and that a subcommittee would be redundant.

90-7 BICYCLE SIGNAL HEAD (continued.)

In a subsequent clarification the consensus of the Committee was that in public rights of way, where unique vehicles are governed by traffic control devices, those devices should qualify as an official traffic control devices. This would pertain to such devices as bicycle signal heads on bicycle paths where the device is only viewed by the bicyclist.

MOTION: By Jack Kletzman, second by Joe Farrow, to request the development of warrants, standards, and draft legislation from the City with assistance from CBAC. Motion carried 8-0.

ACTION: Item continued.

92-18 GOLF CART SYMBOL SIGNS

Dick Folkers reported that he talked to individuals, who might have some influence on the adoption by the FHWA of this sign, at the National Committee meeting in Baltimore. Although the City of Palm Desert is pleased with the experimental use of a golf cart symbol sign, there has been no progress in the adoption of such a sign. The intention is to adopt a national symbol for golf carts.

Dick Folkers said that the electrical system for re-charging a golf cart is different from the system that would be used for re-charging electrical automobiles.

Chairman Tanda recalled that in 1992 the only city granted authority for a golf cart program was Palm Desert. The program allowed golf carts on city streets. Subsequently, AB 110 has been enacted, which allows all communities to have such a program.

ACTION: Item continued.

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93-2 LED STUDY, CALTRANS

Ahmad Rastegarpour told the Committee that the Caltrans experiment in Fresno was started in 1992 using primarily AlGaAs LEDs and had experienced an average 30% degradation in two years. In the past few years advances in technology for both AlGaAs and AllnGaP LEDs have produced superior traffic signals.

Ahmad Rastegarpour requested that Caltrans District 4 (Oakland) be granted permission to experiment with AllnGaP LEDs at 108 intersections in Napa, Solono, Contra Costa, Sonoma, and Sacramento County. Rastegarpour explained that Caltrans was also conducting a human factors study, at the University of California in Berkeley, to establish how alternative light sources compare to incandescent lamps now used in traffic signals. The purpose of the human factors study is to establish a minimum acceptable light intensity level. This test is expected to be completed by the end of the year.

Vic Barbarick said they would install 1535 indications at 108 intersections. The locations will typically be high-speed intersections, remote from maintenance stations. The intention is to achieve savings in power consumption, maintenance, and worker exposure to traffic.

Dick Folkers felt it would be better to start installing LEDs rather than do any further testing. He had not seen any problem. Ahmad Rastegarpour responded that although economy is important, safety was the most important factor and scientific substantiation was needed before Caltrans could proceed with any approval. No other agency has yet conducted a human factors study. The study will determine what minimum level of light output the human eye requires. Rastegarpour said that the observers were selected to produce a range of vision aptitude. Colorblindness was not a consideration because Texas A & M did a study which indicated that impairment was not a concern. He felt that at the conclusion of the human factors study, Caltrans could modify the ITE purchase specification to provide an interim specification, which would probably be available by Spring.

93-2 LED STUDY, CALTRANS (continued.)

Wayne Tanda expressed concern over the number of cities who have LEDs installed or would like them installed and have not come before the Committee. Tanda sees a real urgency on the part of the traffic engineering community to provide the best guidance possible. The ITE specification, while it isn't perfect, it is an interim purchase specification which could be used until the NHRCP study is completed. Adoption of this specification would get the Committee off the hook of either having to review proposed experiments or having to tell local agencies they can't save money by using LEDs in a way they think is safe.

Dick Folkers said that communities with scarce resources were looking forward to using such devices. Folkers, quoting from Caltrans material distributed to the Committee, read "...since district wide testing (District 6, Fresno) no LED array has failed in service. Prior to LED retro-fit District 6 Maintenance had experienced 107 emergency calls to repair incandescent lamps per year. ...." Folkers concluded that this is a good program and that cities and counties were looking for an interim approval. This would allow local agencies to proceed as rapidly as possible to ease the severe financial constraints involved in maintaining traffic signals. Folkers said that when he drives through an intersection he can't tell the difference between incandescent and LED signal. He is concerned that the topic has been reviewed since 1993 without major progress.

Ahmad Rastegarpour reiterated that the issue is liability and responsibility. Caltrans cannot establish a standard without valid scientific corroboration.

Chairman Tanda requested that the Committee concurrently consider Item 96-4 because of the direct relationship between this item and the ITE purchase specification. *[For ease of reference the portion of the discussion concerning Item 96-4 appears under that item number. The reader may wish to review both of these items together.]*

MOTION: By Dick Folkers, second by Bruce Carter to approve the Caltrans District 4 experiment. Motion carried 8-0.

ACTION: Item tabled.

93-5 BIKE LANE DELINEATION ACROSS FREEWAY RAMPS

Jack Kletzman recalled that the Committee, by phone vote, had approved a standard plan for bicycles crossing a freeway. The standard has limited application. The standard was then discussed by Caltrans Design and Traffic Operations units, modified, and now brought back for Committee information.

MOTION: By Dick Folkers, second by Bruce Carter to recommend approval of the bicycle interchange design standard. Motion carried 8-0 .

ACTION: Item completed.

93-18 CROSSWALK, SEQUENTIAL LIGHTING

Sal Rosano recalled that in 1993, the City of Santa Rosa proposed to install, in the pavement, illuminating devices to alert motorist of the potential presence of a pedestrian in the cross walk. The past history of vehicle-pedestrian accidents in Santa Rosa indicates that motorists complain they were not aware of the pedestrian. A number of test sites in the City were approved by the Committee.

Sal Rosano said that two locations were installed in 1994. The third location was installed in April of 1995 and the two existing locations were improved to reflect the experience garnered from the initial installation. There was a "before" and "after" analysis of all three locations shortly after the installation and then again in October of 1995. The findings have been submitted to the Committee and Rosano asked that the Committee consider approval of the devices in concept and forwarded it to Caltrans.

Sal Rosano recalled that the Committee indicated in October of 1995 that experimentation in one community was not sufficient to apply these standards on a statewide bases and recommended that the experiment be expanded to a variety of cities that might be interested in pursuing the experiment.

93-18 CROSSWALK, SEQUENTIAL LIGHTING (continued.)

Due to a misunderstanding of procedure, cities interested in participating in the experiment missed the CTCDC meeting in San Diego and are now requesting permission to experiment.

Sal Rosano said that the experiment was never intended to establish long term durability. The intent of the proto-types was to determine if the technique for alerting motorists to pedestrians in the crosswalk would work. Rosano believes that the experiment has proven that. It was never the intent to validate the devices on the basis of accident history because there are so few accidents at any one crosswalk. Nevertheless in the year and a half that these devices have been in place there have been zero vehicle-pedestrian accidents. Rosano suspects it will take many years to determine if the devices reduce accidents on a statistical basis. He pointed out that the study shows almost all motorists reacted to the devices.

Sal Rosano said that at the non-school site, a counter indicated that the device had been used by pedestrians over 24,000 times with no visible degradation of the newer version of LEDs. Rosano feels this device is a viable option to overhead flashing lights because it is cost effective, less obtrusive, and more effective. Motorists tend to ignore flashing overhead lights after installation since they are used for a variety of other purposes and flash continually.

Steve Weinberger said he represented the six cities of Fort Bragg, Willits, Lafayette, West Hollywood, Petaluma, and Camarillo, who were requesting permission to experiment. Weinberger had done the analysis for the City of Santa Rosa and assisted the six cities in preparing their application for submittal. The City of Fort Bragg's application for experimentation had been approved by phone vote of the Committee because of a pedestrian fatality. He presented to the Committee a paper which described the issues, listed the crosswalk location with some additional information, and identified the source of funding. The first three locations were in Santa Rosa and the remaining ten locations were in the six cities. The FHWA has a nationwide pedestrian facility study underway, has committed funding for studies in Petaluma, and will take part in developing criteria to evaluate the device.

93-18 CROSSWALK, SEQUENTIAL LIGHTING (continued.)

Steve Weinberger told the Committee that the City of Camarillo was a late-comer and their application had not been presented to the Committee. He then submitted their application. Weinberger proposed to conduct a "before" and "after" analysis and present one study which summarizes the findings at ten locations in the six cities. The newest version of the device uses automatic microwave detection, instead of pedestrian push-button activation with a set time for flashing lights. This revision is thought necessary because in Santa Rosa, many pedestrians did not use the activation button, or they were looking for a pedestrian signal head. This also encourages the pedestrian to "choose a gap" in the traffic.

John Wallo said that in San Luis Obispo, he sees motorists continually violating pedestrian right-of-way in the crosswalk. He feels this is due to a lack of enforcement. Sal Rosano said that in Santa Rosa, all forty schools would like a police officer there at the end of session, but it is impossible for police, in any city, to provide that degree of enforcement. The best that can be done is sporadic enforcement on a rotating basis. Rosano said that if a motorist ignores the warning device, no device will stop the potential for collision with a pedestrian. He reiterated his experience with vehicle-pedestrian fatalities, where motorists said they would have slowed or stopped, had they been aware of the presence of a pedestrian. The proposed devices only illuminate when the pedestrian is in the crosswalk and they do get the driver's attention. On this basis, Rosano believes the devices have some merit. Santa Rosa is under pressure to expand the number of locations using the device and has had many inquires from cities wanting to use the device.

Ray Mellen was concerned that there may be a trend by local agencies to reduce the budget for traffic enforcement and shifting the burden to some other sector of government or privatization. Sal Rosano said that Santa Rosa was fortunate in that they have been able to add staff for traffic enforcement. But the growth in traffic related activities far exceeds the ability to keep pace with it. Santa Rosa was looking for other options and this experimental device is one of them because of the history of vehicle-pedestrian accidents in crosswalks.

93-18 CROSSWALK, SEQUENTIAL LIGHTING (continued.)

Steve Weinberger explained that the proposed sites have moderate pedestrian traffic, the Petaluma and Fort Bragg downtown sites have slightly more activity than the others. Weinberger described the activation unit as an overhead microwave device, set within the crosswalk area, to turn on lights when a pedestrian enteres the crosswalk and off when the pedestrian leaves. He noted that the California Office of Traffic Safety (OTS) granted funding for these experiments because the cities involved had an high pedestrian accident rate. He plans to do an inventory of accidents at the test sites but it will have a short time frame Statistically it would take 10-15 years, at any one location, for a valid study.

Steve Weinberger plans interview motorists and pedestrians to examine the problem of "false sense of security." The study will focus on the proposed device as opposed to examining a number of devices. In discussing how to compare this device to an overhead flashing beacon, FHWA suggested that the only way to compare the devices was to install the devices one after the other. None of the cities were willing to spend the extra money to test the flashing beacons. Weinberger does plan to a literature search on the effectiveness of overhead flashing lights.

Several members of the Committee recommended taking data a year after installation. It is felt that this is a truer measurement of the effectiveness of the device. Most motorists react to anything that is new and the delay would allow for driver acclimation. Steve Weinberger said initially speeds went down and the interviews indicated that motorists noticed pedestrians in crosswalks. After a year the speeds returned to where they were but motorists maintained that they noticed pedestrians in crosswalks. Weinberger felt there was some value to a short term analysis and said that no one had asked for a study a year later versus a few months. The year later in Santa Rosa's case just happened to work out that way because of the retrofit. Bruce Carter said he would not pay $20,000 to install a device that showed no effect after a year. Dick Folkers suggested video taping.

93-18 CROSSWALK, SEQUENTIAL LIGHTING (continued.)

Wayne Tanda expressed concern that the Committee will have difficulty recommending to Caltrans that the device be approved unless there were clear experimental requirements. Sal Rosano said it had been assumed that if a proposed advisory device were brought before the Committee, the Committee approved experimentation, and the local agency found it to be a viable alternative, then the Committee would send it to Caltrans. Rosano said they had learned it wasn't that simple. He wondered what other steps were needed and expressed satisfaction that, in Santa Rosa, the experimental device met the need. He said that on an unscientific basis, on days, nights, and weekends, his observation of driver reaction leads him to conclude that the device is effective. Especially in inclement weather and darkness. Rosano said they work and that is why other cities are willing to spend the money to try them. He suggested that the Committee conclude that there seems to be evidence the device may be effective, and recommend its approval as an optional advisory device. It would then be up to Caltrans to approve it and the local agencies who want to use it, have that option.

Wayne Tanda cautioned that, if they grant permission to experiment, the Committee needs to ensure the data collected is sufficient to make an appropriate decision on whether to approve the device. John Wallo said the requests were not specific enough. Steve Weinberger said the intention was to replicate the experiment in Santa Rosa with the addition of night studies and the involvement of the FHWA. *[Supplemental experimentation information was subsequently faxed to Committee members.]* The issue of using amber lights with white cross walks resurfaced, but the Committee in a previous session had approved amber flashing lights as acceptable for all crosswalks.

Merry Banks expressed support for the device and advocated letting the cities do the experiment. Banks wants to increase the conspicuity of the pedestrian. She noted that when cars stop for pedestrians they also obscure the pedestrian from drivers passing on the left. Joe Farrow thought the device was innovative and provided additional protection in that it allows motorists to better identify crosswalks. He was able to see the device from a distance of one-quarter mile. Bruce Carter doubted that accidents could be used as a measure of traffic safety. He feels the public reaction to frequent accidents at school crosswalks would preclude a normal condition. He supports using reaction times, comments, interviews, and braking distances. Carter would like something to show how the device worked in inclimate weather.

93-18 CROSSWALK, SEQUENTIAL LIGHTING (continued.)

Sal Rosano noted that although the original experiment did not intend to test for durability, the retrofitted units have lasted for a year and a half and are still functioning. Jack Kletzman pointed out that the device had been described in the original report but there had been no update information since the retrofit. Steve Weinberger handed out a layout schematic and a raised marker detail. Bruce Carter suggested the device be installed on good pavement to avoid replacement for road repair. John Wallo advocated increasing the effort to educate the pedestrian. Mary Banks said there was a lot being done by the auto clubs, the office of traffic safety, and safe kids coalitions. Its not prominent because of the lack of advertising dollars.

Steve Weinberger acknowledged that the proposed sites do not meet the warrants for Santa Rosa. The Santa Rosa warrants were intentionally very narrow, typically 35-40 mph arterials. Ray Mellen requested that their be some connection drawn between the warrants without delaying experimentation. The Committee agreed to do this by mail. Jack Kletzman requested a draft of recommended guidlines.

MOTION: By Merry Banks, second by Joe Farrow, to grant permission to the Cities of Willits, Lafayette, West Hollywood, Petaluma, and Camarillo, to experiment with the Santa Rosa device subject to approval of the study methodology. Motion carried 8-0. *[Fort Bragg has already been approved by phone vote.]*

ACTION: Item tabled.

95-11 DIAMOND LANE, WARNING SIGNS

Jack Kletzman explained that Caltrans had designed warning signs to alert motorists of potential entrapment in diamond lanes. These signs were submitted to the Committee and there had been some recommended changes. Kletzman took the signs to the HOV Systems and Freeway Operations offices within Caltrans for their concurrence. Having reached a consensus among all parties, the signs were revised and about to be presented to the Committee for final approval at the last meeting.

95-11 DIAMOND LANE, WARNING SIGNS (continued.)

At that meeting Kletzman received a FAX from Robert Kady of the FHWA. Kady had a number of comments which warranted consideration. Kletzman requested a continuance for time to examine the comments. Most of the comments, while valid, did not directly pertain to the proposed signs. There was an exception. That was a condition where lanes, approaching the HOV entrance, gave the motorist the option of either turning or continuing straight. As a result of this possibility, another symbol sign was added to the package.

Jack Kletzman noted that the Committee had already reviewed the signs, with the exception of the additional sign resulting from Robert Kady's comments, and asked for the Committee's recommendation for approval. John Wallo suggested substituting dashes for numbers on the sign specifications to be consistent with the Traffic Manual.

Bill Hoversten said that, although some HOV facilities require three people, all ramp metered facilities are for two people. It is anticipated that it will be a long time before any ramp facility will require three. Since these warning signs are to be used for traffic approaching ramps no note for a variable number is needed. Ray Mellen, concerned with overloading the motorist with information, suggested adopting the symbol sign and the plate defining the carpool occupancy. Jack Kletzman responded that the ramp metering office needed to define specific ramp metering conditions.

MOTION: By Dick Folkers, second by John Wallo for recommending approval of the proposed diamond lane warning signs. Motion carried 8-0.

ACTION: Item completed.

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95-13 HIGHWAY MARKERS, CALTRANS
EXPERIMENT WITH SAFETY STRAND

Jack Kletzman explained that Caltrans had come before the Committee to request experimenting with a purple plumed device, fastened to the pavement. The purpose of the plume was to provide visible marking in snow, and yet withstand snowplow operations. The vendor's device looked promising. Laboratory tests indicated that exposure to ultra violet light bleached the plume to a nearly white color after 189 hours. The product had failed in the laboratory. The vendor was notified and has not responded. Kletzman recommended that this device be rejected and the item completed. If the vendor were able to improve the pigment stability, Kletzman said Caltrans would be willing to retest the device.

MOTION: By Jack Kletzman, second by Bruce Carter to rejecti the Safety Strand highway marker. Motion carried 8-0.

ACTION: Item completed.

96-2 UNEVEN PAVEMENT SIGN

Jack Kletzman recalled that he had previously asked the Committee for a continuance because the sign needed more work. Revisions were made, including comments from the Committee, and the sign was presented in the agenda. Kletzman passed out a revised policy stating that the sign should be used where the difference in elevation is equal to or greater than 0.15 feet (46 mm) between adjacent lanes. This policy is consistent with the Caltrans Standard Specifications.

John Wallo expressed concerned about possible litigation resulting from using the sign. He experienced problems with low shoulders where motorists overcorrected. Bruce Carter suggested using an UNEVEN LANES sign. Dick Folkers said his city limits the drop to 3/4 " (19 mm). Jack Kletzman said that a maximum allowable drop was specified to define when the sign was needed. Otherwise the sign would be needed everywhere. Wayne Tanda suggested specifying traffic lanes to distinguish it from the shoulder area.

96-2 UNEVEN PAVEMENT SIGN (continued.)

MOTION: By Dick Folkers, second by Jack Kletzman to recommend approval of the uneven pavement sign. Motion carried 6-0 with 2 abstentions.

ACTION: Item completed.

96-3 ILLUMINATED LEFT TURN YIELD SIGN

Wayne Tanda said that Item 95-9, a request to experiment by the City of Lake Elsinore with a static sign for protected-permissive left turns, was approved by the Committee. Tanda had suggested an activated sign which would indicate YIELD at the appropriate time. The City of San Jose proposes an experiment at two locations in downtown San Jose. The first would be a protected-permissive signal at San Carlos and 3rd Street. The YIELD sign will light up when the green ball appears and will be unlit the remainder of the time. A few blocks away there will be a permissive-protected signal exists. The sign will light up in the first phase when the green ball appears. There is an error in the documentation. The City intends to keep the green ball activated when the arrow appears. The YIELD sign would extinguish at the appearance of the arrow.

John Wallo expressed concern as to how well the sign would function with direct sunlight on the legend. Dick Folkers said the newer type lens covers would be able to prevent the legend from appearing because of sunlight. Wayne Tanda thought the sign would be white on black neon. Jack Kletzman said the electrical section of Caltrans suggested that circuitry for the YIELD sign be wired through the green ball so that the sign could not appear unless the ball was illuminated. Tanda said the experiment would take approximately six months.

MOTION: By Dick Folkers, second by Bruce Carter to approve permission to experiment by the City of San Jose on an illuminated YIELD sign to be used in conjunction with protective-permissive and permissive-protected signals.
Motion carried 8-0.

ACTION: Item tabled.

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96-4 ITE PURCHASE SPECIFICATION FOR LED TRAFFIC SIGNAL MODULES

[At the request of Chairman Tanda, Items 93-2 LED STUDY, CALTRANS and 96-4 ITE PURCHASE SPECIFICATION FOR LED TRAFFIC SIGNAL MODULES, were discussed simultaneously. For ease of reference the portion of the discussion concerning Item 93-2 appears under that item number. The reader may wish to review both of these items together.]

Wayne Tanda reviewed that Caltrans is conducting a study in District 6 (Fresno), a human factors study at the University of California at Berkeley, and a study in District 4 (Oakland). Other current studies include an ITE purchase specification and an NCHRP study.

Wayne Tanda views the NCHRP study as being the definitive work upon its conclusion in three years. He believes that there will probably be tens of thousand of LED installations by the time the NCHRP study is completed. Eighteen months ago, ITE, observing what was happening, initiated a process which developed the interim purchase specification for LEDs to bridge the time gap until the NCHRP study is available. Its not perfect, but extensive time and effort have gone into the ITE study. The process is at the final stage, where a review panel will vote on approval of the interim specifications.

Wayne Tanda acknowledge there was some concern expressed concerning the point at which LEDs degrade to an unacceptable level. Tanda said that the ITE interim specification uses the figure of 60% of the initial installation. Referring to remarks made by Les Kubal of Caltrans, Tanda said that Kubal may be willing to accept 55% degradation with incandescent bulbs, but wanted to conduct a study for confirmation. Others across the nation have come to the same conclusion, although it was without any corroborating studies. The interim specification has a provision to recommended 60% degradation over three years as a minimum. The three year period is what was felt to be sufficient to recover initial installation cost.

96-4 ITE PURCHASE SPECIFICATION FOR LED TRAFFIC SIGNAL MODULES (continued.)

Wayne Tanda said that the City of San Jose had appropriated $1 million of general funds to pay for a 300 LED signal project. It was considered the number one priority in competition with all other services for the city. The City will probably use the ITE specification with such enhancements as a five year guarantee for 60% degradation level. Tanda would like Caltrans to consider adoption of the interim specification with whatever modifications Caltrans deems appropriate and to report back to the Committee at the first meeting to be held in 1997. This would give Caltrans time to review the ITE specification and make those changes indicated by the human factors study, which is anticipated to be completed in December.

Wayne Tanda wants the CTCDC to get out of the business of reviewing local jurisdictions requests for LED experimentation. Worse yet, to refuse them. Three jurisdictions had been refused by the Committee. *[The Committee had agreed to consider by phone vote any local agency which already had LED devices installed. Other local agencies were to appear before the Committee. Although there may have been additional reasons for rejection, the principal impediment appears to be that there was no immediacy for a phone vote and these agencies could appear in person.]*

Jack Kletzman acknowledged that the Committee was in agreement in recognizing that the definitive study will ultimately be done by the NCHRP and that something needs to be done in the interim to assist all public agencies, the State included, to reduce the cost of power consumption. But there is a problem. The problem is that there needs to be some scientific basis upon which Caltrans can establish a Statewide standard. At this point in time there is no such basis for Caltrans, or anyone else, to establish a standard. Wayne Tanda pointed out that the motion would allow Caltrans the time it needed. Kletzman agreed, but wanted to point out that a need existed to establish safety parameters, in addition to the need for everyone to save money. Kletzman felt the advent of advanced technology, such as the AllnGaP LEDs, has materially improved the prospect of Caltrans approval.

Ahmad Rastegarpour said that the goal of the human factors study was to establish the level of acceptable degradation. He believes this will be the scientific basis Caltrans needs. The study is anticipated to be completed in December.

96-4 ITE PURCHASE SPECIFICATION FOR LED TRAFFIC SIGNAL MODULES (continued.)

Wayne Tanda emphasized that the ITE was a minimum specification and any jurisdiction could exceed them. Ray Mellen wanted to make sure Caltrans had enough time to complete its study before the Committee took action. Tanda preferred to take the action now and allow Caltrans to return at the next meeting and have a proposal or need more time to complete the experiment.

Joe Genovese suggested allowing local agencies to purchase LEDs based on the specification that Caltrans will use for their District 4 experiment. Jack Kletzman responded that the Committee was prohibited from issuing a blanket approval.

David Evans supported the motion. He told the Committee that the State of New Hampshire had just converted to 100% LEDs. The State Traffic Engineer for Massachusetts told Evans that his State was converting. Evans said they will all use, as a basis, the ITE purchase specification. He expects the City of Philadelphia to convert. They will use a specification developed by the Urban Energy Consortium. Evans said that, to his knowledge, there had been no previous human factors study. He said that the ITE spec calls for a 24° cone but manufacturers are producing a wider 30° cone. Evans said the Caltrans Oakland experiment LED manufacturer uses fewer lamp count and secondary optics to achieve higher performance than those LEDs available for the Caltrans Fresno experiment. The reduction in lamp count not only reduces power consumption, it also increases the long term reliability of the lamp because of reduced heat. Moisture is no longer a problem because the sealing of signal modules is now water tight. Evans feels the products now being produced are one hundred times better than the designs of 1990-1992.

David Evans said that his high temperature operating data shows AlGaAs red technology produces 25,000 hours with 45% degradation. AllnGaP red technology produces 100,000 hours with 25% degradation. AllnGaP red technology now has the potential to produce a ten year life. The ITE specification calls for three year life.

Ray Mellen expressed concern that there hasn't been any human factors study before this time and suggested that the Committee encourage such testing.

96-4 ITE PURCHASE SPECIFICATION FOR LED TRAFFIC SIGNAL MODULES (continued.)

Steve Prey said that there has been a fundamental change in how Caltrans views the maintenance of traffic signals at intersections. In the past it had been Department policy to replace red incandescent signals once a year because these lamps only lasted about one year. The human factors test is being conducted to find the longevity of alternate sources of light. In order to do this we need to know at what point does the source of light produce insufficient light and what is the definition of insufficient.

Steve Prey told the Committee that fifty years of incandescent lamps has taught us that after a year there is about a 10% degradation from its initial brightness. The Caltrans human factors study will determine the threshold level at which the human eye can distinguish whether the signal is on or off. We would then define what is bright enough to be safe for any alternative light source. A comparison of the degradation curve and the minimum brightness level will produce the number of hours of life for a given light source. The scientific information being obtained from the study at Berkeley is to determine the threshold brightness levels. This is an issue no one has needed to address, prior to the development of LEDs, because incandescent light sources completely burn out when they no longer function. Establishment of the threshold points include other light sources besides LEDs and pertain to yellow and green as well as red.

Ahmad Rastegarpour said that looking good to the motoring public was not sufficient definition to establish standards.

MOTION: By Dick Folkers, second by John Wallo to recommend Caltrans consider adoption of the ITE LED interim purchase specifications for traffic signal modules with whatever modifications Caltrans deems appropriate and to report back to the Committee. Motion carried 6-2.

ACTION: Item continued.

CTCDC MINUTES
September 5, 1996

96-5 SIGNAL PHOTO ENFORCED SIGN

Ray Mellen said that a significant message is needed for the motorist concerning the red light signal photo enforcement. Jack Kletzman told the Committee that Gary Foxen had alerted him to the fact that legislation had been enacted which required new signing. The law is not in effect unless the motorist is notified about photo enforcement. Foxen recommended the verbiage SIGNAL PHOTO ENFORCED. Kletzman supported the suggestion and verbiage, and a standard sign was approved. Kletzman then passed out a new SIGNAL PHOTO ENFORCED standard. The policy had been revised to conform to the law, which allows the sign to be used either at a signal or at the entrances to the city.

Jack Kletzman said he had received suggestions for other signs. One sign, from the City of El Cajon, said PHOTO ENFORCEMENT, and had a picture of a camera. The other sign, from the City of San Francisco, said CAMERA ENFORCED, had the CVC code, and a picture of a signal. Kletzman said Caltrans approved its SIGNAL PHOTO ENFORCED sign because of the urgency, but remains open to recommendations from the Committee.

John Wallo suggested consideration of two signs because different verbiage may be needed for the signal than at the entrances of the city. Dick Folkers said that even if the entrances of the city were signed, not all signals need to have cameras.

Jack Fleck said that the City of San Francisco is doing a pilot study and presented two signs to the Committee. Fleck suggested something more visual than just a verbiage legend was needed. The legend could be CAMERA ENFORCED or PHOTO ENFORCED and the vehicle code section was included because it was a new law. The pilot program for the City of San Francisco, will monitor a few intersections and the sign will be mounted at the signal. If the pilot is successful, the City would mount signs at the entrances to the city. In that case, the City was considering putting a plate under the sign saying IN SAN FRANCISCO.

96-5 SIGNAL PHOTO ENFORCED SIGN (continued.)

Jack Fleck explained that signs would typically be mounted on the far side mast arms. The cameras would also be mounted far side. Fleck said that a grant to the City's Health Department was being used to educate the public to red light awareness campaign. The two projects are intended to go together. There has also been a lot of publicity through the press. John Wallo wondered if the sign was adequate because the legislation refers to "automated enforcement systems." Fleck responded that, in the future, it is possible that novel devices could be available, but vendors are currently marketing 35 mm cameras. He also noted that video devices are also cameras. Merry Banks thought that "photo" was more specific than "camera." Wallo said it was the photo that was doing the enforcing. Fleck asked for permission to use the sign at least for the pilot program.

The consensus of the Committee was not to include the section of the Vehicle Code as a part of the standard sign. The local jurisdiction could, if it wished, add or later remove a separate plate citing the Code. The consensus of the Committee was also that the same sign could be used either at a specific location or at entrances to the city.

Perry Lowden suggested putting the yellow and green balls in white since the red ball is the only signal enforced. Jack Fleck said they had considered that design, but felt that the public perception of a signal would be the solid ball configuration. Bruce Carter concurred that the public would recognize the solid ball configuration as a symbol for a signal. To color only the red ball might cause trouble. Jack Kletzman supported the solid ball configuration because, even though the proposed sign uses a schematic representation, people would recognize it as a signal. Carter said that symbol was also used on other signs.

MOTION: By Bruce Carter, second by John Wallo to recommend adoption of the San Francisco sign with a PHOTO ENFORCED legend. Motion carried 8-0. *[Caltrans will eliminate the current standard and adopt the sign recommended by the Committee so that only one sign will be used for this purpose.]*

ACTION: Item completed.

CTCDC MINUTES
September 5, 1996

96-6 SEISMIC RETROFIT AND EARTHQUAKE REPAIR SIGNS

Bruce Carter said he got a letter from Don Raffaelli that questioned the purpose of the Seismic Retrofit sign. Carter said he had never seen a sign that had the logo of the agency on it. He pointed out that the sign had never come before the Committee. Carter does not believe the meaning of the sign is apparent. He agrees with Raffaelli that the sign doesn't look beneficial.

Jack Kletzman responded that the sign is not a traffic control sign. Its use is to inform the public that a project involving earthquake safety is under construction. This sign is similar to the funding appropriations signs to demonstrate to the public how their gas tax money is being spent. That sign includes the Caltrans logo and the route shield. This is basically a Project Development sign which is to be used for conspicuous projects that will be under construction for over a year.

John Wallo and other members of the Committee said the sign should be rectangular. Wayne Tanda said the sign was unclear. Its shield, color, and reflectivity make the sign look like a traffic control device instead of a promotional sign. It should not look like a traffic control device. Bruce Carter suggested substituting a verbal explanation for the unclear symbols. Dick Folkers thought Caltrans attempted to come up with something that was quick to recognize but without an explanation, the message is lost. Ray Mellen thought a supplemental plate would have been sufficient.

Joe Farrow thought such a sign was contrary to Caltrans' policy of minimizing the number of signs and that the sign was unintelligible. He did not understand the need for this sign in view of the difficulty erecting signs favored by the CHP. Dick Folkers observed that the sign was large enough to provide a reasonable explanatory message.

MOTION: By Joe Farrow, second by Dick Folkers to recommend that Caltrans redo the seismic retrofit sign because the message is unclear and it looks like a traffic control device. Motion carried 7-0 with one abstention.

ACTION: Item completed.

CTCDC MINUTES
September 5, 1996

96-7 SPEED LIMIT SIGNING

Ray Mellen expressed concern about changing the speed limit to 65 mph in some urban areas and retaining 55 mph in others. It is unclear to the motorist what the speed limit may be. In the past the motorist could expect, with minor exceptions, a single speed limit on freeways. He advocates additional signing. Gary Foxen had made a proposal which included putting speed limit signs in medians and a spread sheet listing conditions for erecting speed limit signs.

Jack Kletzman responded that Caltrans has concerns about safety issues with regard to placing speed limit signs in the median. He views the proposal as being too extensive. There is agreement however that additional signing is warranted in urban areas. Kletzman suggested the item be continued so that Caltrans would have some time to formulate a policy for the Committee to examine.

John Wallo suggested putting speed limit signs on structures. Jack Kletzman opposed this suggestion because lane closures would be needed to place and maintain the signs. Bruce Carter observed that the motorist might be confused that the speed limit was lane specific. Ray Mellen said that when he worked for Caltrans the Structures people were adamant against putting anything up on a structure.

Joe Farrow said that it is becoming common for people in court to plead that they thought the speed limit was different than it actually is because of a lack of signing. Farrow agreed that there were areas that needed additional signing. Wayne Tanda suggested that CHP be included in reviewing the policy.

Perry Lowden agreed that there were holes in the highway signing which needed attention, but cautioned against using too specific a policy.

ACTION: Item continued.

CTCDC MINUTES
September 5, 1996

PUBLIC COMMENTS

None.

96-A FOREIGN TRAFFIC CONTROL DEVICES

ACTION: Item continued.

OFF-AGENDA ITEMS

Jack Kletzman said the tourist information signing program is no longer handled by the Right of Way Branch. There is a change in the TOURIST INFORMATION sign policy. All existing signs will remain in place until maintenance is required. At that time the facility shall be reviewed. Any TOURIST INFORMATION signs placed from now on shall be to facilities which are either publicly owned or operated by a business association representing several businesses which might be of interest to tourists.

Jack Kletzman told the Committee there is a change in the policy for post-secondary school signing. The problem was that a part-time student was not accurately defined. The policy now states, in order to have signing a public or private post-secondary school must have 1000 or more full time students or average 1000 or more different part-time students each week the school is in session during the normal school year. A part-time student is defined as one who is attending one or more classes at the institution in a given week. A part-time student attending more than one class is counted as one student.

Jack Kletzman said he sent a letter to Sharif Traylor of the California Energy Commission based on a flyer sent to him by Dick Folkers. The flyer encouraged energy efficiency by offering financing if an agency used LEDs in traffic signals. The letter alerted the Commission that LEDs were not official traffic control devices and according to the Vehicle Code should not be placed in a street.

OFF-AGENDA ITEMS (continued.)

Wayne Tanda said at a recent ITE meeting one of the topics was Federal sign reflectivity standards. Tanda came away with the impression that Federal standards were eminent. The standards have to do with the sizes of letters and reflectivity of signs based on the aging of the motoring public. Jack Kletzman said he checked with the lab and with the New Products Secretary and there were no new standards. There have been standards for newly installed signs but none for minimum acceptability level. Dave Royer agreed there were some standard being developed but they are not yet in effect. Royer said they were not a major concern because signing material last at least 10 years and will outlast the sign itself. He doesn't anticipate a problem when the standards come out because it will be a very low standard. Kletzman said Caltrans participated in the Federal test program.

Dave Royer expected to see the new specifications when the new MUTCD is published which may not be for awhile. Royer said that they measured reflectivity from signs that were 15 years old which weren't even starting to approach low levels. The signs will fade before they run out of reflectivity. Even Type I which is the cheap engineer grade is now acrylic and will last much longer that the older signs. Kletzman said that was the same information he was getting at Caltrans. Perry Lowden said a signs reflectivity can be destroyed by slush in the winter time or in the desert where the sign gets sand blasted. Wayne Tanda said he will contact the presenters from the ITE meeting.

Bruce Carter told the Committee that the FHWA is putting together an older driver design handbook. They are currently seeking comments on the draft. Carter distributed one element of the draft to the Committee for illustration. He is concerned with the potential for litigation and speculates that the disclaimer will not deter any lawyer. If research substantiates that changes are needed, to provide for the older driver, then Carter believes the existing manuals should be changed. He suggested some blend between when an older driver should no longer be allowed to drive and the minimum size of traffic control device.

OFF-AGENDA ITEMS (continued.)

Dick Folkers, who has a large population of older drivers, said that the City of Palm Desert had tried to incorporate some consideration for older drivers in their signing and striping. Folkers cautioned that the loss of driving privileges has serious consequences. The issue of whether an older driver should be on the road at all, versus the loss of mobility and independence is a very difficult question. Folkers suggested that may be the handbook might be a guide as opposed to a manual.

Wayne Tanda interpreted "...used as a problem solver at older driver accident sites and as a guide for enhanced design of facilities where justified by large numbers of older drivers in the traffic stream..." to mean, the proposed handbook was to be used after an accident analysis determined that there were a disproportionate number of accidents involving older drivers. Bruce Carter responded that he had a large percentage of population which might qualify under the "... large numbers of older drivers in the traffic stream..." reference.

Tanda felt there was no problem to refer to a different set of guidelines in a special set of circumstances. He also thought that perhaps the handbook should clarify the definition of "older driver" and "large numbers." Carter said the handbook was for construction zones and there would be no history to examine. He reiterated his fear of excessive litigation from having two sets of standards. Dick Folkers said the City of Palm Desert may have modified standards to accommodate the older population, but no one had conducted an accident analysis to determine whether such modifications were warranted. Tanda said the City of San Jose routinely reviews traffic accident data to see if there are any special trends, including age.

ADJOURNMENT

MOTION: By Dick Folkers, second by Bruce Carter for adjournment.
Motion carried 8-0. The meeting was adjourned at 3:20 pm.

CALTRANS ACTIONS

Item 90-7 BICYCLE SIGNAL HEADS

Item in progress.

Item 92-4A TRAFFIC SIGNAL DIMMING, CITY OF SAN JOSE

Item tabled.

Item 92-4B LED STUDY, CITY OF SAN JOSE

Item tabled.

Item 92-4C LED STUDY, OTHER LOCAL AGENCIES

Item tabled.

Item 92-18 GOLF CART SYMBOL SIGN

Item in progress.

Item 93-2 L. E. D. STUDY, CALTRANS

Item in progress.

Item 93-4 CONVEX MIRRORS

Item tabled.

Item 93-5 BIKE LANE DELINEATION ACROSS FREEWAY RAMPS

A standard, recommended by the Committee, has been adopted by Caltrans.

Item 93-10 SIGNING, LIME-YELLOW SPECTRUM

Item tabled.

Item 93-12 PEDESTRIAN CROSSWALKS

To be deleted at the request of the sponsor.

Item 93-18 CROSSWALKS, SEQUENTIAL LIGHTING

Item in progress.

Item 93-14 SPEED CONTROL SIGN, EXPERIMENTATION REQUEST

Item tabled.

Item 94-3 STOP SIGNS AT MID BLOCK

Item tabled.

CALTRANS ACTIONS

Item 94-10 PEDESTRIAN SIGNAL HEAD

Item tabled.

Item 95-9 LEFT TURN LANE PROTECTED/PERMISSIVE SIGN

Item tabled.

Item 95-11 DIAMOND LANE WARNING SIGNS

The signs recommended by the Committee have been approved by Caltrans (SW54, SW54-1, SW54A, SW54B, & SW54C).

Item 95-13 HIGHWAY MARKERS, CALTRANS EXPERIMENT WITH SAFETY STRAND

Device failed Caltrans lab test. Experiment canceled.

Item 96-2 UNEVEN PAVEMENT SIGN

Symbol sign recommended by Committee approved by Caltrans (C41 & C41A).

Item 96-3 ILLUMINATED LEFT TURN YIELD SIGN

Item in progress.

Item 96-4 ITE PURCHASE SPECIFICATION FOR LED TRAFFIC SIGNAL MODULES

Item in progress.

Item 96-5 SIGNAL PHOTO ENFORCED SIGN

Caltrans will adopt the sign recommended by the CTCDC (SR56).

Item 96-6 SEISMIC RETROFIT AND EARTHQUAKE REPAIR SIGNS

Caltrans will not revise the sign.

Item 96-7 SPEED LIMIT SIGNING

Item in progress.